2017

Treble in the Environment: Incorporating Music into Environmental Education

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A Thesis Submitted in Partial Fulfillment of a Bachelor of Arts Degree in Environmental Analysis

Pitzer College, Claremont, California

April 27, 2016

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Abstract

In this era where global sustainability is challenged, environmental education plays a vital role in building environmental awareness. Other roles of environmental education include the promotion of responsible citizenship and the fostering of environmental advocacy in children. As a way to strengthen these goals of environmental education, this thesis explores the dynamic uses of music to compound on the fields impact. I argue that the benefits of music outlined suggest music's power to heighten environmental sensitivity from a young age. I use narratives from the environmental education, music, education, and psychology discourses to demonstrate the theoretical advantages of music in conjunction with environmental education. I also conduct my own research with Pitzer's Leadership in Environmental Education Partnership, to put the theories into action. As a result, I find music to be an antecedent to the development of environmental sensitivity; music is not only instrumental in promoting environmental citizenship, but can be a way to achieve an environmental revolution by inspiring communities to mobilize for change.

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Acknowledgments

Reflecting on my thesis journey, words cannot describe my gratitude for all of whom that have supported the culmination of this thesis. To my readers, Professor Paul Faulstich and Professor Roberta Espinoza, thank you for your invaluable input during the writing process. To Susan Philips, thank you for your undeniable belief and motivational words each week. To my senior thesis classmates, thank you for being my community. To Professor Melinda-Herrold Menzies, thank you for your constant support over the last four years.

A big thank you to my fellow environmental educators, for your flexibility in conducting and facilitating my research study. Thank you to Melissa Jackson and Sycamore Elementary school for participating in Pitzer's Leadership in Environmental Education Partnership and for making this research possible.

I am eternally grateful for the love and support of my family and friends. Mom and dad, none of my successes would be possible without you. This thesis is as much yours, as it is mine. To my friends, thank you for being my pillars of support.

Chapter 1

Prologue

We all need somebody that we can lean on

when you wake up look around and see that your dreams gone

when the earth quakes we'll help you make it through the storm

when the floor breaks a magic carpet to stand on

we are the World united by love so strong

when the radio isn't on you can hear the songs

a guided light on the dark road you're walking on

a sign post to find the dreams you thought was gone

someone to help you move the obstacles you stumbled on

someone to help you rebuild after the rubbles gone

we are the World connected by a common bond

Love the whole planet sing it along. – Michael Jackson

I recall the day a magnitude seven earthquake occurred in Haiti in 2010. My father held a cup of coffee in his hand and we watched the breaking news on television; reporters delivered tragic news about the millions affected by the earthquake by playing video clips. I had goose bumps looking at the heartbreaking images of destroyed homes and thousands of people seeking refuge at camps. The news invoked a combined sense of helplessness and sympathy in my family, where the disaster silenced us across the globe. A month later, I heard the song *"*We Are the World 25 for Haiti*"* raising awareness about the disaster. As a singer, I was immediately captivated by the soulful tune. I downloaded the song and shared it with friends. We memorized

the lyrics and performed the song in our local community to encourage others to donate and participate in the relief efforts.

Originally written and sung by Michael Jackson in 2004, "We Are the World" was readapted in February 2010 following the earthquake that devastated Haiti earlier that year. This song was re-recorded by artists to reach a new generation and aid the rehabilitation efforts in Haiti. In this case, artists came together for a cause to heighten awareness using music. If they could inspire me and my friends to take action who were half way across the world, I couldn't help but wonder if others were influenced by the song in a similar way. *Am I moved only because I'm a singer? Does music impact others in the same way? Does music have the ability to increase environmental awareness and advocacy?* These are some of the questions I explore in this thesis.

Introduction

Music is a universal form of expression. In the form of melodic patterns and rhythms, music is a powerful medium of communication that generates emotion across populations. Humans interact with sounds on a daily basis whether through the beating of their hearts or through the rustling of leaves on trees. Some individuals learn about contemporary music and create harmonic sounds using instruments, while others may interact with music through chanting religious texts. Humans perceive harmonic sound vibrations as music, allowing them to express their emotions. This inherent connection between the human and nonhuman worlds allows for manipulation to mobilize individuals for a cause. Using the strengths exercised by environmental education, psychology, and the music discipline itself, music supports the environmental movement in propagating environmental education goals more effectively. In

order to cultivate advocacy, music can be used by environmental education to heighten environmental sensitivity and ensure participation of generations in the movement.

Statement of Positionality

The use of music within environmental education is limited. While there are theoretical frameworks to support the integration of music with environmental education, there is a lack in implementation of lesson plans that engage auditory senses. With the aim to reveal the benefits of music in strengthening the environmental movement as a whole, I use my experience in both the music and environmental fields to inform my argument supported by multidisciplinary literature. Since I've been trained as an Indian Classical singer from the age of seven, and am a Western Classical singer, I have always had a connection with music growing up. My relationship with music influences my choice in exploring the benefits of this art. But it is experiences like waking up to birds singing every morning, that has informed me of the interconnectedness of both environmental education and music. On the other hand, my belief in the power of environmental education is informed by its positive impact on the environmental movement that I have observed. During my experience of creating curricula and teaching elementary school students for three years, I have seen environmental education's potential in promising a sustainable world. My goals for this thesis are to prompt more research on the benefits of combining these fields, identify music as a precursor to fostering environmental sensitivity, and cultivate the environmental movement by uniting individuals towards a global issue.

Roadmap

In an effort to reveal the advantages of integrating music with environmental education, the remainder of this chapter provides a background on discourses of music and environmental education. Chapter two then expands upon this knowledge by outlining the existing scholarly works around these fields. This chapter explores the two discourses independently and highlights the limited literature around the conjunction of environmental education and music. Through engaging secondary sources like journal articles, books, and historic documents, this chapter forms a foundation for my argument. After establishing scholarly relationships, chapter three analyzes the role of music and sound in established environmental education curricula; looking closely at curricula produced by Project Learning Tree (PLT) and experienced environmental educators. This chapter uses primary sources acting as a template for exposing how and why music should be used by environmental educators. It also shows how music is an influential precursor to responsible behaviors in young children. The next chapter utilizes this template and presents my research that seeks to implement a successful curriculum that integrates sound through Pitzer's Leadership in Environmental Education Partnership (LEEP). The program brings elementary school children to a protected chaparral ecosystem named the Robert J. Bernard Field Station in Claremont, CA. This chapter adopts a comparative analysis revealing the nuances of the use of music to have a positive impact on student attitude and participation with the lesson plan. Chapter 6 then acts as a concluding section that suggests ways for this interdisciplinary field to expand and identifies the limitations of this thesis.

Why Music?

Our world is filled with infinite natural sounds. Whether it may be the roar of the wind or the buzzing of a bee, sound exists at various frequencies having differing impacts on humans. Some sounds with high frequencies are unappealing to the ear, like an airplane engine, whereas some appear to be "music" to the ears. Humans place value on certain sound frequencies, occurring in harmonic and melodic patterns, calling them music. While the construct of a sound being musical is expanding in its scope to include dissonant sounds; there is tremendous research to show that harmonic musical sound undoubtedly prompts a positive attitude in humans through stimulating emotions. This framework of music, informs my rationale of using the medium to assist in achieving the goals of environmental education.

Humans produce sound for self expression in the form of speech, voice, and bodily sounds like coughing. In regards to the voice acting as a musical instrument, humans have been producing music for a long time. Natural sounds serve as a foundation for anthropogenic music forming an inherent connection between nature and humans. Cognitive research indicates that the perception of music by humans is a biological phenomenon. The anthropology and musicology fields frame music to be dominantly influenced by culture (Cross & Morley, 2009). Irrespective of the origin, music has played an integral role in shaping generations and their customs.

Traditionally, music occurs in active and participatory contexts within human communities. It involves the active engagement of people in activities and provides a component of entertainment through participation (Clayton *et a*l., 2004). This relationship is clear through archaeological evidence which proves that musical behaviors have been a part of human life for many millennia. Modern humans in Europe displayed instrumental musical behaviors from at

least 36,000 years ago, manufacturing musical pipes from the bones of birds (Scothern, 1992). There has also been a marked increase in the evidence of musical activities from 30,000 years ago, including the creation of percussion instruments and the use of rocks and caves for their acoustic properties (Cross and Watson, 2006; Morley, 2003). Over the year's, human interaction with music has evolved with varying capacities. Music has been a universal form of expression emerging from communities all over the world. In the words of John Blacking (1995, p. 224), a prominent ethnomusicologist, "every known human society has what trained musicologists would recognize as music".

Across cultures and over time, the forms and significances of music are extremely diverse (Cross & Morley, 2009). Since I am a singer in two rich oral traditions that developed independently of one another, diversity in sound is prominent in my life. Both Indian and Western classical traditions share their root in religious texts whereas the sounds differ in form. In most non-Western cultures, however, music requires overt action and active group engagement. Music is employed not just in entertainment and courtship, but as an essential component of ritual; it often marks transitions between different stages of life (e.g., from adolescence to adulthood), as well as consequential events such as funerary rituals and seasonal festivals. Music may function in the maintenance of oral traditions by virtue of its mnemonic powers as well.

Similarly, diversity manifests itself in environmental studies through ecology. In understanding the relationships of organisms with the environment, the field of ecology encompasses the study of natural communities on a global scale. Like music, ecology thrives on diversity to interpret the interconnected environment in relation to varying communities of life. This exploration of unique characteristics to interpret the environment is common to both fields.

They also recognize humans to greatly impact the areas of study. These parallels draw on the idea of coevolution and emphasize the inherent connection of humans with the environment.

Considering the cultural and biological connections to music, it is also capable of uniting communities. The experience of a coordinated activity prompts a strong sense of group identity through synchronized communication. Music allows each participant in the activity to interpret its significances for themselves, without the integrity of the collective musical behaviors being undermined (Cross & Morley, 2009). This phenomenon is described by Meyer (2008) as a "metaphorizing medium", where music can represent disparate ideas through a medium from which multiple experiences for the self can be constructed. Music provides a platform for collective participation, where personalized emotions and experiences generate.

Background on Environmental Education

The environmental education movement has been evolving over several decades. Whilst the words 'environment' and 'education' were not used in conjunction until the 1960s, this evolution incorporates the significant influence of some eighteenth and nineteenth century thinkers such as Goethe, Rousseau, Humboldt, and Montessori (Palmer, 2002). The field of environmental education is characterized by a paradox where a few doubt the importance of living in a sustainable manner, yet the field is not given priority in the education system (Palmer, 2002). The field requires advocacy to be considered a core element of education. For this to be achieved, the field needs to be legitimized further by drawing connections across disciplines. This thesis builds on previous literature to continue the narrative about strengthening the impacts of environmental education on children.

The first recorded use of the term 'environmental education' can be traced to a conference in England held in 1965 at Keele Univeristy, Staffordshire (Palmer, 2002). The

conference investigated conservation of the environment in the countryside and its implications for education, paving the way towards creating a formal declaration of what environmental education meant. This would allow other institutions and individuals to participate in the movement too. With this purpose in mind, the most widely accepted definition of environmental education was formulated by the IUCN/UNESCO 'International Working Meeting on Environmental Education in School Curriculum' held in 1970: "Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture, and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulation of a code of behavior about issues concerning environmental quality" (IUCN,1970).

This definition is integral in framing my argument and provides the necessary context to understand the goals of environmental education. The field promotes great responsibility and commitment towards developing an empathetic attitude towards our surroundings. In an era where millions grow up in urban environments, children are spending less time in natural surroundings, thus hindering the development of a positive attitude towards it. A two-year study, funded by the English government, revealed the staggering statistic of one in nine children not setting foot on a park, beach, forest or any natural environment for at least 12 months. Regardless of these spaces being deemed as natural, the number is alarming as it reveals the limited interaction of children with any form of the outdoors. For this reason, environmental education becomes a highly valuable tool in addressing the gap growing between nature and children (Natural England, 2016). As environmental sensitivity is rooted in childhood experiences in nature (Chawla and Cushing, 2007), Louv poses a pivotal question asking where

the future conservationists will come from if the gap between children and nature continues to widen (Louv, 2005).

Environmental education is a viable solution by forming a connection for children with nature. The literature over the years has presented theoretical evidence based on studies with children. One such study conducted by Ernst & Theimer (2011), assesses the effectiveness of programs in increasing the connectedness between students and nature. They conduct a quantitative study with 385 children showing a significant increase in connectedness through two of the seven programs they evaluated (Ernst & Theimer, 2011). Other works integral towards showing the effectiveness of environmental education is the much cited book of *Children and Nature* (Kahn & Kellert, 2002). Carl Safina, an author associated with the National Audobon Society, describes the book to "propagate a love of nature for children that may ultimately be the most important pathway out of the biodiversity crisis" (The MIT Press, 2017).

Music is another tool that assists in connecting children with nature. Considering its dynamic relationship with humans in the past, music assists in creating an additional connection for children with the environment. There are widely accepted advantages of using music to propagate the objectives of environmental curricula. However, there is a gap in its potential and application in the formal field due to a limited number of resources for educators to utilize (explored further in chapter three). This conjunction relies on passionate educators that develop frameworks using music to teach environmental education such as Cermak (2012). He describes an educational initiative that implements green hip-hop to stimulate learning in a science classroom. He challenges his students to compose their own lyrics in an urban setting targeting racially diverse learners. In addition, scholars in Zimbabwe document the implications of using the Shona folktale as a tool address multifaceted issues (Mutasa et al., 2008). They recognize the

strength of using cultural folk stories to enable learners to develop a critical lens towards environmental issues.

The diversity of music in its potential to develop environmental advocacy is clear with these two examples. With these examples, it is used as a form of expression in creating lyrics of a song, or as a source of learning about cultural narratives in the case of using folktales. Both activities initiate conversation about environmental challenges and allow time to address ways in which action can be taken: they demonstrate how music can be used to foster responsible behaviors. Keeping these successful activities in mind, the next section establishes the literature on the integration of music with environmental education.

Chapter 2

Literature Review

Environmental education requires an interdisciplinary lens to study pro-environmental behaviors of responsible citizenship to increase individual participation in the environmental movement. I argue that music can be employed as one of the tools in promoting the development of sensitivity to environmental issues. Outlining the connections between music and environmental education, this literature review explores how music can be a valuable indicator towards predicting environmentally sensitive behavior. This review also paves the way for further interdisciplinary research by demonstrating the importance of studying the mechanisms of pro-environmental behavior through different disciplines.

The niche of music in environmental education is one that develops a sensitive attitude to environmental issues by fostering environmentally responsible behavior (Burgess & Gold, 1985; Hines, Hungerford, & Tomera 1986; Hwang, Kim, & Jeng, 2000). However, such attitudes are most strongly attributed to significant life experiences, including exposure to charismatic environmentalists, books, and outdoor experiences (Chawla, 1998; Eagles & Demore, 1999; Tanner, 1980). Turner & Freedman (2004) find that music can serve as a connection between humans and the natural world acting as an antecedent to fostering environmental advocacy and responsible action during childhood (Turner & Freedman, 2004). While there have been studies that show the benefits of integrating music with environmental education in instilling sensitivity towards the environment (Turner & Freedman, 2004; Ramsey, 2002), music is generally not recognized as an individual factor influencing individual's sources of responsible behaviors (Tanner, 1980; Hungerford, Peyton, & Wilke, 1980; Peterson, 1982; Sia, Hungerford & Tomera,

1986; Palmer, 1993; Chawla, 1998). This gap in the literature is first explored through the environmental discourse by identifying key ways in which responsible action is influenced, and is followed by an interdisciplinary analysis of how music is crucial in achieving the goals of environmental education.

Environmental Education Discourse

Rachel Carson was one of the first to articulate the importance and characteristics of environmental education at the early childhood level (Carson, 1956). In her book *The Sense of Wonder*, she writes about the importance of rediscovering the "joy, excitement, and mystery of the world we live in" to keep the "inborn sense of wonder alive" (Carson, 1965, p. 45). Influenced by authors like Carson, environmental education since the Tbilisi Declaration in 1977 has sought to initiate individual commitment towards resolving environmental issues (Intergovermental Conference on Environmental Education, 1977). As a part of this declaration, awareness, sensitivity, knowledge, and participation were listed as crucial elements towards achieving individual responsible citizenship (Hungerford & Volk, 1990). Scholars since have engaged with ways to study environmental sensitivity as one precursor to influencing responsible environmental behaviors in the form of qualitative research (Tanner, 1980; Hungerford, Peyton, & Wilke, 1980; Peterson, 1982; Sia, Hungerford & Tomera, 1986; Palmer, 1993; Chawla, 1998). As Hungerford & Volk (1990) state that knowledge alone does not ensure responsible action, identifying accurate conditions motivating responsible environmental citizenship became key (Hungerford & Volk, 1990).

Environmental sensitivity is an aspect of awareness, one of the objectives of environmental education codified in the international Tbilisi Declaration (UNESCO, 1980, p.

71). It was initially defined as "a set of affective attributes which result in an individual viewing the environment from an empathetic perspective" (Tanner, 1982, p. 5). In an effort to study this phenomenon further, two influential scholars Tanner (1980) and Peterson (1982) conducted qualitative research in the form of open-ended surveys and structured interviews to predict the participation of individuals in taking action (Tanner, 1980; Peterson, 1982). Tanner (1980) recorded data from autobiographical recollections from members of environmental organizations to identify common antecedents of their responsible actions. Peterson (1982) collected data from environmental educators instead, focusing on their antecedents of sensitivity and attitude to their personal responsible actions. By finding common sources of inspiration that could be manipulated in classrooms to engage more people, this research formed a model for others to replicate and test. While both pioneering studies have subtle differences in intention, they intriguingly yielded similar results to the findings of more recent studies as well (Sia, Hungerford, & Tomera, 1986; Hungerford & Volk, 1990; Palmer, 1993; Palmer & Suggate, 1996; Chawla, 1998; Eagles & Demore, 1999).

Tanner (1980) and Peterson (1982) have been consistently cited by scholars following their studies (Sia, Hungerford, & Tomera, 1986; Hungerford & Volk, 1990; Palmer, 1993; Palmer & Suggate, 1996; Chawla, 1998; Eagles & Demore, 1999). Although Tanner (1980) initiated the research into autobiographical antecedents that are now considered precursors to sensitivity, he did not use the term. The concept of sensitivity was introduced into this literature by Peterson (1982; Peterson & Hungerford, 1981). She chose to carry out a study of developmental variables affecting environmental sensitivity in professional environmental educators. According to Chawla (1998), her research makes a significant empirical contribution to the understanding of motivations behind environmental concern and commitment, which

forms the basis of an environmental sensitivity scale developed by Sia (1984), and is applied in several studies (e.g., Marcinkowski, 1987; Ramsey & Hungerford, 1989; Sivek & Hungerford, 1989-1990).

As Tanner (1980) and Peterson (1982) serve as models for succeeding studies, their results have also been integral towards recognizing antecedents of responsible behavior. Their findings below in Table 1 and 2 outline common categories such as the outdoors, adult role models, books, habitat loss, and love for surrounding nature as inspiration for responsible action. There is no consistency in the listed categories, but shared themes can be deduced from both studies. For example, Peterson (1982) identifies the most influential antecedent as "the outdoors", while Tanner (1980) identifies his most influential antecedent as "natural areas". Both scholars suggest environmental surroundings to be an integral precursor to environmental sensitivity, prompting further investigation. In more recent studies in the environmental education discourse, the theme of the "outdoors" emerges as the largest factor influencing environmental sensitivity (Sia, Hungerford, & Tomera, 1986; Hungerford & Volk, 1990; Palmer, 1993; Palmer & Suggate, 1996; Chawla, 1998; Eagles & Demore, 1999). Other categories listed also reflect similar themes.

TABLE 1. Influences on Choice of Conversation Work

Influence(a)	Respondents, %
Natural areas	78
Habitat: frequent contract	58
Parents	47
Teachers	31
Books	29
Other adults	27
Habitat alteration	24
Solitude outdoors	7
Miscellaneous	31
Travel abroad	11

Note. Adapted from Tanner (1980). N = 45 (37 males, 8 females).

TABLE 2. Influences on Attitude Toward the Environment

Influence	Respondents, %
Outdoors	91
Family vacations	68
Childhood play	50
Youth groups/camp	41
Hunting/fishing	45
Family	59
Study of natural systems	45
Love for area in which raised	32
Professional responsibility	27
Habitat alteration	23
Environmental organization	18
Books	18
Peer sensitivity	9

Note. Adapted from Peterson (1982). N = 22 (17 males, 5 females).

Table 1 and 2: Critical antecedents identified by Tanner (1980) and Peterson (1982) summarized by Chawla, 1998.

Nonetheless, Chawla (1998), a prominent scholar in the environmental education discourse, writes that deliberate replication and consistency is required if the research area is to be built systematically. She says that few attempts have been made to replicate the original

findings, as most studies have differing goals. As I noted above, Tanner and Peterson also displayed varying intentions: Tanner sought to explain the antecedents of action, Peterson the antecedents of affect. Thus, Chawla (1998) notes that all the recent studies ask their respondents differing questions to explain the sources of their choice of conservation work or environmental education or their attitudes, sensitivity, interest, dedication, or practical concern (Sia, Hungerford, & Tomera, 1986; Hungerford & Volk, 1990; Palmer, 1993; Palmer & Suggate, 1996; Chawla, 1998; Eagles & Demore, 1999). These constructs may all be aspects of responsible environmental citizenship, but they cannot be assumed to be identical. She suggests that future research should focus on the antecedents of action, not just affect.

Combining disciplines to compliment the study of pro-environmental behavior strengthens the research and aids environmental education to identify ways in which to achieve the ultimate objective of developing sensitivity. Given that the majority of the influences on developing environmental sensitivity first occurred during childhood or adolescence (Tanner, 1980; Peterson, 1982), psychology supports this rationale emerging from the environmental education discourse. Psychologists provide evidence for instilling heightened sensitivity during childhood as well (Črnčec, Wilson, & Prior, 2006; Kahn & Kellert, 2002; Wilson, 1996; Turner & Freedman, 2004).

In exploring psychology as a means to amplify the goals of environmental education, Wilson (1996) states that there are two fundamental premises supporting environmental education during the early childhood years, specifically preschool years. One is that children must develop a sense of respect and caring for the natural surroundings in their early years or be at risk for never developing such attitudes, in turn affecting responsible environmental action (Stapp, 1978; Tilbury, 1994; Wilson, 1994). While this field of early childhood environmental

education is still emerging, Tilbury (1994) reflects a growing awareness that "environmental experience in the critical phase of the early learning years can determine subsequent development in environmental education" (Tilbury, 1994, p. 11). Additionally, Wilson (1996) outlines the second premise of the rationale supporting education during the early childhood level to be based on the positive interactions with the natural environment as an integral part of healthy child development (Cobb, 1977; Crompton & Sellar, 1981; Miles, 1986/87; Patridge, 1984; Sebba, 1991; Wilson, 1994). She also suggests that such interactions enhance children's learning and quality of life over the span of one's lifetime by relating nature to a source of wonder, joy, and awe (Wilson, 1994). For these authors, environmental education does not only prove to have a higher influence during childhood by fostering sensitivity, but also positively impacts child development.

The Intersection: Music and the Environment

Rachel Carson has a significant impact in shaping the newly emerging field of environmental education through her book *The Sense of Wonder.* In her other works, Carson writes about the environment engaging several other lenses too. For example, in her pivotal book *Silent Spring* she reveals ways in which humans form relationships with our environment (Carson, 1962). One of which, as the title alludes, is through natural sounds or birdsong. Carson stresses that her own auditory sense of natural surroundings emerging from her childhood on her family farm. She is able to generate an emotional response resulting in action from her readers by emphasizing a musical connection with nature.

Understanding of the relationship between music and humans has been evolving since its first interpretation by Greek mathematician Pythagoras (circa 560–circa 480 BCE). He believed

that there was a "music of the spheres" caused by precise and harmonious relationships among the planetary orbits (Henderson, 2000, p. 1; Verlag, 2001). Since, several philosophers have contributed as prominent thinkers believing that music is a fundamental element of nature providing a connection between humans and the natural world (Turner & Freedman, 2004). According to Clark and Rehding (2001), music is not only a form of expression for humans, but also exists in the sounds of the natural world. Sounds originating from both biotic and abiotic parts of nature have been a source of inspiration for musical composers, as well as a direct source of music (Clark & Rehding, 2001). Turner and Freedman (2004) describe sounds such as the rhythmic splashing of waves, the pattering of ran, the thunder of lightening, and the rustling of wind in foliage are all deemed as "agreeable" sounds, making them musical. All these sounds are claimed to enhance relaxation, heighten connection with nature, and to have inspired musicians from Beethoven to The Beatles (Turner & Freedman, 2004). Other links between animals and music include the documentation of songs of various animals in musical notation and theories of the development of melodious bird songs from the harmonic structure of single-note sounds (Clark, 1879).

This perception towards music considerably changed in the 18th-century of Enlightenment, experiencing a "disenchantment" of nature associated with the rise of "objective" scientific study (Chua, 2001). The Scientific Revolution (between years 1500-1800) had a particularly fundamental role to play in the increase in disenchantment of humans with nature too, one result of which lead to the unsustainable relationship with the natural world (Merchant, 1980). The plea to re-establish a deep connection between humans and nature is being facilitated by composers such as Schafer (1991), a Canadian composer, advocating for music to be a catalyst in supporting that connection (Turner & Freedman, 2004). Several other musicians

continue to integrate natural sounds and use their songs to support global environmental awareness, like Michael Jackson with his song "*Earth Day"* in 1995. Centering on the destruction and rebirth of Earth, the song went on to receive a Grammy nomination in 1997, leading to recognition from various environmental organizations. Music, in this case, was used to draw attention to the degradation of Earth using its lyrics and natural sounds to motivate people to engage in responsible behaviors.

Why is Music Instrumental to Environmental Education?

The role of music in environmental education discourse has typically focused on its ability to capture the interest of students and to foster a sensitive attitude to issues (Burgess & Gold, 1985; Lenton, 2002; Ramsey, 2002). Nevertheless, such attitudes are most strongly attributed to significant life experiences, and other inspirations in the environmental education discourse (Chawla, 1998; Eagles & Demore, 1999; Tanner, 1980). Turner and Freedman (2004) are the primary scholars connecting music and environmental education. They argue that music should be considered as a factor in predicting responsible citizenship during childhood by referring to music as "a nonscientific, but valid approach that builds empathy by providing an aesthetic understanding of the natural world and environmental issues" (Turner & Freedman, 2004). They show that music is seen as a powerful medium to engage a broader audience through engaging multiple learning styles. They also see music as a tool to teach about environmental issues through lyrics. Morgan (2001) additionally argues that music can be utilized in a classroom to maintain or increase student interest in a topic (Morgan, 2001). Keeping the goals of environmental education in mind, scholars propose ways it can appeal to a larger audience using music. They also suggest that music is a precursor to the development of environmental sensitivity.

Considering the inherent connection between humans and the natural world discussed in the previous section, music offers additional benefits to the environmental education movement (Turner & Freedman, 2004). Turner and Freedman suggest that music can be used in classrooms that aid the development of a relationship between humans and the natural world. They encourage the use of natural sounds, multimedia presentations, and focused musical performances. Music is used to emulate, praise, and celebrate nature, as well as to increase awareness of environmental degradation. Music is a nonscientific approach to environmental education and builds empathy by exposing students to the natural surroundings through physical sounds, anthropogenic melodies, and lyrics (Turner & Freedman, 2004). Natural sounds like bird songs, and other animal noises have been sources of inspiration for not only writers like Carson, but musical composers too. These artworks have been sources of environmental movements through their lyrics and the emotional connection they provide for the audience or reader to take action.

As an additional crucial role of music, the art medium encourages the physical and mental participation of children. Inside of the classroom, music is viewed to be more "fun" and immediately engages children with the topic (Turner & Freedman, 2004). Outside of the classroom, scholars of social movements show that music creates an emotional connection and provides free space for a bonding experience to take place between group members (Roederer, 1984; Blacking, 1969; Roscigno & Danaher, 2004; Eyerman & Jamison, 1998). Roscigno and Danaher (2004) and Eyerman and Jamison (1998), emphasize that music can provide a space where grievances can be shared and new forms of knowledge derived. This research is built on by Meyer (2008) that defines music as a "metaphorizing medium" which can be an inviting platform for individuals to personally and collectively have an emotional experience.

Jones and Yee (1993) provide a biological lens to this discourse as well, stating that pulse abstraction facilitates an optimal use of attention resources over time. Their experiments show that events occurring in temporal alignment with the inferred pulse of music are detected and identified more easily than events that occur out of phase with pulse. These phenomena are critical in attaining the goal of participation set by the environmental education discourse (IUCN,1970), by prompting kinesthetic movement captivating more learning styles, and in facilitating the development of an emotional connection for a particular issue.

Music creates biological, social, and psychological connections with our environment. This is advantageous to the goals of environmental education inside and outside of the classroom by providing a dynamic platform to explore. Taking the works of Carson (1962), Turner & Freedman (2004), Morgan (2001), and Ramsey (2002) further, the next chapter addresses the lack of scholarly attention to the intersections of environmental education and music. Newer works such as the *Book of Music and Nature*, the first anthology that connects music and nature by 20th century masters, is a step to integrating the two discourses (Rothenberg & Ulvaeus, 2013). It provides a stimulating conversation about the relationship between humans and our natural soundscapes, but does not propose ways to strengthen the environmental movement. In a generation where changing climate is a reality, understanding the relationship between nature and music is not enough. Thus, the next chapter provides a curricular lens towards fostering environmental advocacy and ultimately complimenting the goal of improving environmental education using music.

Chapter 3

The Curricular Illustration: Environmental Advocacy inside the Classroom

The environmental education field is primarily shaped by individuals affiliated with research institutes, schools, non-profit organizations, and the government. Through The North American Association for Environmental Education (NAAEE), these individuals collaborate to establish a set of guidelines for developing and selecting high quality environmental education curricula. This collaboration ensures environmental education to grow and scaffold on its previous knowledge. The recommendations produced through the collaboration, in the form of an annual publication series, are accessible to anyone interested in exploring environmental curricula. The supporting material developed is also employed by instructors by participating in formal workshops or purchasing established activity guides such as PLT and Project WILD. These guidelines serve as a tool to ensure a firm foundation of the curricula and to trigger improvements of existing ones. Through providing clear goals for the students, the recommendations help instructors facilitate a superior educational process leading to increased environmental advocacy in the classrooms.

Early Childhood Environmental Education Programs: Guidelines for Excellence, as a part of the continuing series of documents published by the NAAEE, inform the objectives of curricula created for elementary students in particular. The curriculum framework for environmental learning of young children ultimately fosters growth and the development of environmental sensitivity. This is achieved by the framework's focus on social and emotional growth, development of environmental understandings, skills for understanding the environment, personal sense of responsibility and caring, and physical health and development (NAAEE, 2016). These broader goals are then directed by measurable steps with an over arching emphasis

on active participation, exploration, generating ownership, building a community, assisting with biological knowledge, and developing an interdisciplinary lens.

Music plays a large role within the context of attaining the objectives of environmental curricula. In addition to the established benefits in the previous chapter, music is recognized to also address the need for engaging technology in the education system. It is deemed to be a "trendy medium" by younger generations, and appeals to the auditory senses of students, prompting interest (Turner & Freedman, 2004). Figure 1 below, provides a synthesis of the outlined benefits of music in curriculum thus far.

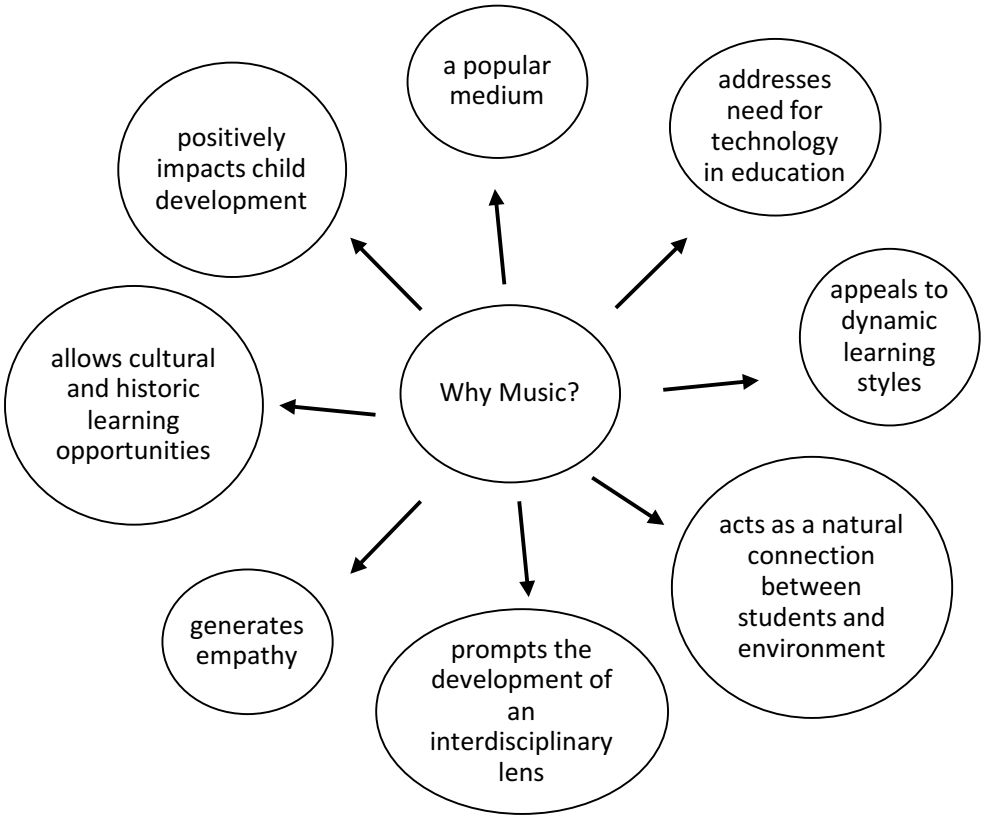


Figure 1: Diagram covering the established benefits of music in environmental education curricula through the lenses of music, environmental education, and psychology.

For the purpose of Figure 1 above and the following sections, I use the words "sound" and "music" interchangeably. In a dictionary, the words imply differing concepts, however both sound and music stimulate the auditory senses. Assistant professor of music at Dartmouth, William Cheng, describes music to be "a type of sound. It is a pleasant sound, or sound that has meaning and cultural value ascribed to it" (Stearns, 2015). More simply, music is a human construct that recognizes certain sound patterns to be more valuable than others, while sound refers to any vibration in air or any other medium. Since music can't exist without sound, I use both frameworks to describe activities with environmental curricula which ultimately engage the auditory senses. For example, one of the benefits of music according to Figure 1, is that it facilitates the development of empathy towards the environment. Students can listen to natural sounds gaining an appreciation for the surroundings, but can also listen to music that incorporates natural sounds or musical lyrics that invoke a sense of caring. Music in this case, also serves as a "metaphorizing medium" that can generate empathy through group participation. Through this example, it is clear that the impact of sound and music or sound/music cannot be isolated. Thus, in accordance with the environmental education field, I use both terms to symbolize the power of listening to encourage pro-environmental behaviors.

Despite the evidence of music in generating responsible environmental citizenship, established curricula lacks the integration of music in its material. PLT, a popular source of curricula present in all 50 states of the Unites States of America and other countries, provides only one activity that utilizes music in its latest publication of 96 listed activities (PLT, 2016). Other organizations such as Project WILD and WET exhibit limited engagement with music in their curricula as well. Educationists and naturalist organizations, on the other hand, show successful examples of activities based on the established objectives of environmental education

(NAAEE, 2016; Oneida Indian Nation, 2017). The curricula incorporate elements of cultural, biological, environmental, political, and historic knowledge through music.

A Closer Look at Outdoor Activities

The Oneida Indian Nation, an indigenous nation of Native American people located in New York (Oneida Indian Nation, 2017), present a valuable source of curricula that integrates music with environmental education (refer to Table 3). The activity prompts discussion about agriculture using traditional practices, which is a key environmental issue experienced among global communities. Appealing to all four common modalities of learning, namely tactile, auditory, visual, and kinesthetic, the implementation of the Three Sisters Garden captures the interest of all students. It relies on the emotional connection created through the corn-planting traditional dance, promoting a natural connection with the environment. The activity additionally creates an opportunity to develop an interdisciplinary lens towards agriculture through the application of cultural and biological knowledge. Thus, Three Sisters Garden is a valuable example of curricula that represents the dynamic role of music with environmental education. It can easily be utilized by educators in an outdoor setting and is a fun activity to conduct with elementary children.

Activity	Description	Learning Objectives	Materials
Three Sisters Garden	○ Plant symbiotic crops of corn, beans, and squash ○ Encourage students to participate in the corn-planting traditional dance ○ Repeat the dance and celebrate the garden through harvest	○ Learn about the biological interdependence between the crops ○ Learn basic gardening techniques ○ Develop a cultural respect for the plant species and the native knowledge ○ Allow opportunity for movement and physical interaction with the topic ○ Explore the principles of polyculture	○ Crop seeds ○ An open plot of land ○ Gardening tools ○ A speaker and electronic source for music

Table 3: Adapted from the section of Companion Planting on Oneida Indian Nation (Oneida Indian Nation, 2017).

Similarly, *Listen Up!* is a great resource for engaging the auditory senses and encouraging conversation about a relevant environmental issue (refer to Table 4). The activity is short, but nonetheless impactful towards recognizing the interwoven landscape of nature with people, and the space they occupy within it. The duration of silence immediately draws attention from the students and stimulates their imagination towards identifying the sources of sound. The

discussion following the three minutes of silence, allows for critical thinking and sharing of thoughts as well. Further reflection on the most appealing sound encourages writing practice and provides ownership over the activity which supports the development of an individual experience during the activity. Lastly, in identifying differences between anthropogenic and natural sounds, students are prompted to discuss noise pollution and ways in which it can be reduced in the surrounding community. This allows for an opportunity for students to apply the learnings from the lesson to their personal lifestyles, ultimately fostering environmental advocacy.

Activity	**Description**	**Learning Objectives**	**Materials**
Listen Up	○ Pick an open area to listen for surrounding sounds outside for a silent duration of three minutes ○ Count and identify the number of sounds you hear in the open space ○ Discuss the sources of the sounds, the direction from which they originated, and identify anthropogenic vs. natural sounds ○ Identify favorite sound and write a reflection about why	○ Differentiate between anthropogenic and natural sounds ○ Explore an oral connection with the environment using auditory senses in an outdoor setting ○ Enhance critical thinking and problem solving skills ○ Recognize the modern soundscape ○ Develop an appreciation for sounds in surrounding environment	○ An open plot of land ○ Writing instrument ○ Paper

Table 4: Adapted from the activity “Listen Up!” in Project Learning Tree (PLT, 2016, p. 28).

Both activities independently embrace the outlined advantages in Figure 1 of integrating music with environmental education. While the curricula illustrated do not provide a comprehensive view of the field and the additional ways in which music can be employed, they are powerful examples easily adopted outside of the classroom. The activities overall exhibit ways in which music increases participation and interest, generates ownership over an issue, assists with biological knowledge, and develops an interdisciplinary lens. Organized questions complimenting the activity are integral towards maintaining a naturalist approach to the experience as well.

This chapter acts as a foundation recording the use of music and inspires the documentation of other successful curricula. As there is limited literature in the incorporation of music with environmental education, chapter four puts *Listen Up!* into action and assesses its impact in generating environmental sensitivity. I am able to assess the effectiveness of the activity and sound in general, by comparing two different lesson plans where one predominantly relies on stimulating the auditory senses while the other does not. To produce tangible results sparking further research as well, I use both quantitative and qualitative data to demonstrate my argument. This research was possible through an existing partnership at Pitzer College with it's local community, which aims to compliment the theoretical advantages of music in strengthening the environmental movement.

Chapter 4

Applying Theory into Practice

Interconnectedness with the environment, whether through sound, community or other relationships, have shaped the human world. Despite these connections, the gap between humans and the environment continues to grow. With 54% of the global population living in urban areas in 2014 (DESA United Nations, 2014), the interconnectedness between individuals and their natural surroundings suffer as a consequence. Future generations are growing up with processes such as globalization, urbanization, and economic development, all of which dominate public ideologies at the detriment of the environment. As a result, physical and mental barriers between the human and the non-human worlds widen due to an increase in desensitization towards the environment. A lack of ecological awareness permeates through generations along with a loss of emphasis on harmonious living with the environment.

Environmental education strives to "understand and appreciate the inter-relatedness among man, his culture, and his biophysical surroundings," according to the International Union for Conservation of Nature (IUCN,1970). Music, with its diverse sound properties, offers one way to facilitate the restoration of some of these connections in conjunction with curricula. While the IUCN aims to address the "inter-relatedness" among humans and the environment, I argue that environmental education addresses the "interconnectedness" among the same, further developing respect and appreciation. "Inter-relatedness" explains a reciprocal relationship. However, "interconnectedness" takes our understanding of these connections further, incorporating the idea of dependence. The environment shapes human life providing resources and dictating culture to an extent, however, does not rely on humans for its existence. This is a

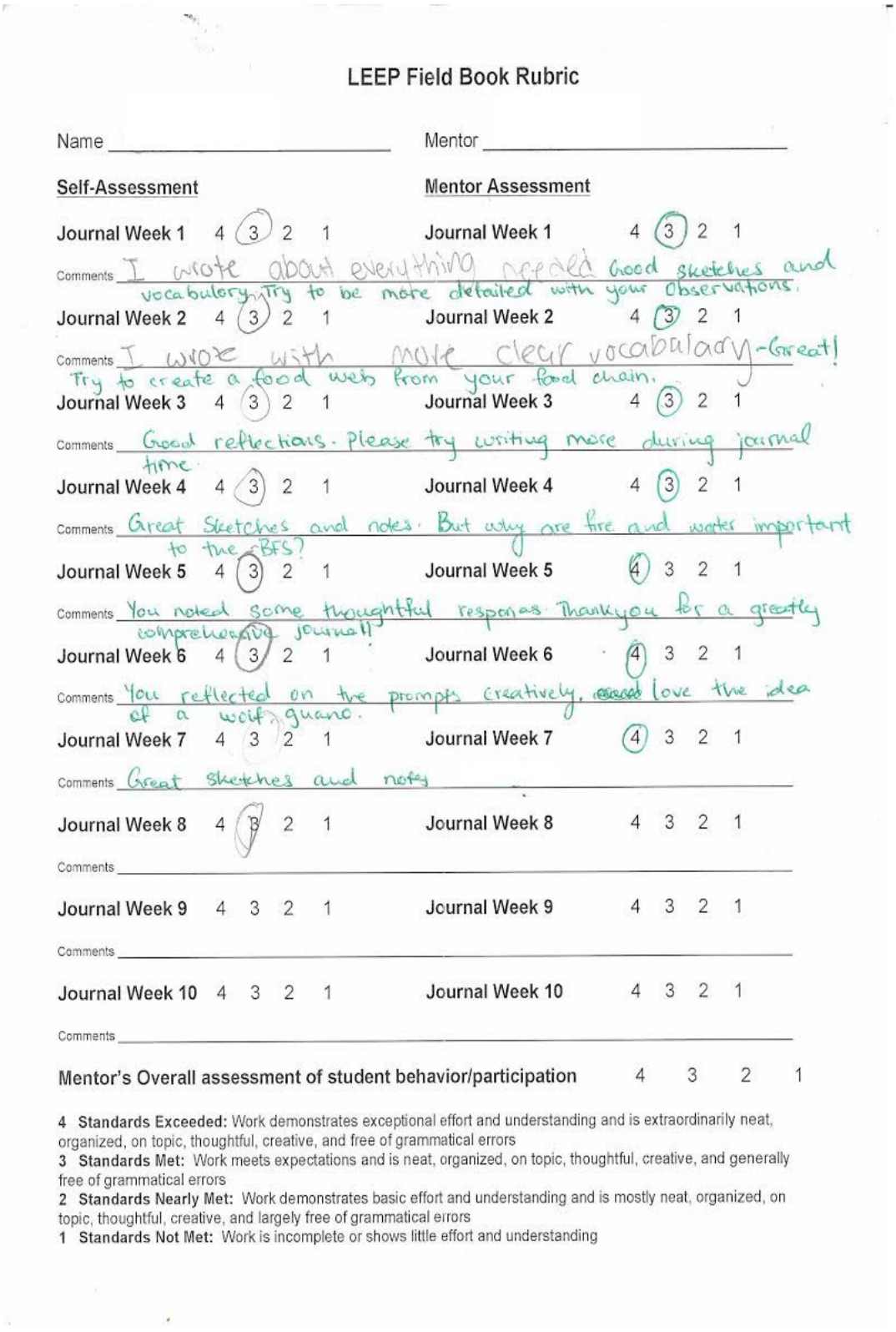
crucial difference in teaching environmental education, a field which can be examined through an ecological and musical lens.

As an environmental education instructor, I witness the power of curricula centered around generating environmental awareness in children. Along with fostering an empathetic outlook, the curricula also promote pro-environmental behaviors in children from within classrooms and outdoor settings. My choice of activity during teaching influences the students' interest in the topic and in turn affects the potential for gaining knowledge. As many elementary school instructors lack formal training in the environmental field and are expected to teach in school settings, access to resources for lesson planning is fundamental for creating an effective experience. This chapter outlines the successful use of *Listen Up!* and reveals the benefits of employing sounds when in practice compounding the benefits of the environmental curricula itself.

During my participation in LEEP in the spring semester of 2017, I studied the learning outcomes of sixth grade students in an outdoor setting. Since 1996, LEEP has provided hands-on lessons at the Robert J. Bernard Field Station (BFS) in Claremont, that harbors the coastal sage scrub ecosystem in addition to a constructed aquatic habitat, coastal oak woodlands, vernal pools, and a riparian zone. Four schools currently participate in the program. The activities incorporated in the program encourage the development of an environmental ethic and ecological identity (Faulstich, 2004). Students at the Claremont Colleges collaboratively design lesson plans and guide the elementary school children through the various activities on the Field Station. Acting as mentors, the college students also grade the children based on their reflections in their field books each week.

I worked in a team alongside three other college students with Sycamore Elementary school. Through LEEP, our team worked closely with 31 children engaging them with activities centered around critical thinking. All activities aimed to foster environmentally responsible behaviors by balancing knowledge with exploration. Our teaching approach was inclusive of all learning styles and relied on small group dynamics to promote participation. We engaged in hands-on activities that addressed dominant learning modalities and prioritized smaller group activities. During the weekly workshops, we split the children into separate trail groups, allowing the mentors to form relationships with the children and enable more interactive activities to unfold.

The research compares our team's collaboratively designed lesson plan for week one, with my lesson plan for week six of the LEEP program. The lesson plans display varying teaching approaches, emphasis on learning styles, and results. The results, or the effectiveness of the lesson plan, is indicated by a journal reflection that students complete each week. This writing exercise helps the mentors in assessing how the material is being received, as well as track the students progress over the weeks. The reflections are graded on a scale from one to four, where four represents a comprehensive understanding of the lesson. The mentors consider the student's effort, progress, and grasp of the information when assessing the reflection.



LEEP Field Book Rubric

Name _____ Mentor _____

Self-Assessment		Mentor Assessment	
Journal Week 1	4 (3) 2 1	Journal Week 1	4 (3) 2 1
Comments	I wrote about everything needed Good sketches and vocabulary. Try to be more detailed with your observations.		
Journal Week 2	4 (3) 2 1	Journal Week 2	4 (3) 2 1
Comments	I wrote with more clear vocabulary - Great! Try to create a food web from your food chain.		
Journal Week 3	4 (3) 2 1	Journal Week 3	4 (3) 2 1
Comments	Good reflections. Please try writing more during journal time.		
Journal Week 4	4 (3) 2 1	Journal Week 4	4 (3) 2 1
Comments	Great Sketches and notes. But why are fire and water important to the BFS?		
Journal Week 5	4 (3) 2 1	Journal Week 5	(4) 3 2 1
Comments	You noted some thoughtful responses Thankyou for a greatly comprehensive journal!		
Journal Week 6	4 (3) 2 1	Journal Week 6	(4) 3 2 1
Comments	You reflected on the prompts creatively, I love the idea of a wolf guano.		
Journal Week 7	4 3 2 1	Journal Week 7	(4) 3 2 1
Comments	Great sketches and notes		
Journal Week 8	4 (3) 2 1	Journal Week 8	4 3 2 1
Comments			
Journal Week 9	4 3 2 1	Journal Week 9	4 3 2 1
Comments			
Journal Week 10	4 3 2 1	Journal Week 10	4 3 2 1
Comments			

Mentor's Overall assessment of student behavior/participation 4 3 2 1

4 Standards Exceeded: Work demonstrates exceptional effort and understanding and is extraordinarily neat, organized, on topic, thoughtful, creative, and free of grammatical errors

3 Standards Met: Work meets expectations and is neat, organized, on topic, thoughtful, creative, and generally free of grammatical errors

2 Standards Nearly Met: Work demonstrates basic effort and understanding and is mostly neat, organized, on topic, thoughtful, creative, and largely free of grammatical errors

1 Standards Not Met: Work is incomplete or shows little effort and understanding

Figure 2: An example of the LEEP assessment.

The lesson plan for week one was designed to serve as an introduction to the various habitats of the BFS (refer to Table 5). From the minute students set foot on the field station, they are encouraged to be attentive to the environment. The lesson enables exploration of the chaparral ecosystem with the walk to the outdoor classroom, followed by a lecture providing ecological and historical information about the BFS. The lesson is crafted to engage the students spatially; students stay attentive because of the manner by which the material is presented by the mentors from the corners of the outdoor classroom. After providing a working biological knowledge of the Chaparral ecosystem, the students participate in a PLT activity named *Adopt a Tree*, where the students are encouraged to implement a naturalist lens towards their observations. The activity prompts collaborative learning through group-based discussion and provides an opportunity for students to take notes on their chosen tree. Their writing skills are further developed through journaling in their LEEP field books after the activity, where the students then take ownership of the material and apply a critical lens in answering the given questions. Overall, the lesson plan investigates the habitats of the BFS, using primarily a lecture based teaching approach compounded with writing exercises to reflect on the material.

Time	Activity	Description	Learning Objectives	Materials
8:50 - 9:05	Tour to classroom	- Guide students to classroom and ask them to look out for any fauna	- Prompt a naturalist approach to being outdoors by maintaining silence and observing - Engage with their surrounding environment	- Binoculars
9:05 - 9:40	The Chaparral Ecosystem: lecture	- Mentors collectively introduce the Chaparral biome - Discuss the history of the BFS - Refer to the field book to discuss flora and fauna of BFS	- Understand the Chaparral ecosystem - Identify the common species of the ecosystem - Differentiate between Coastal Sage Scrub and Chaparral ecosystems - Describe the BFS to be a resource to the community	- Big white chart to take notes during lecture - Flashcards with info for leaders
9:40 - 10:00	Snack Break			
10:00 – 11:00	Adopt a Tree Activity	- The trail groups split and find a spot with multiple trees - Students choose a tree to describe in discussion - Mentors present a series of prompts for students to advocate for their tree	- Strengthen observational skills towards a naturalist approach - Develop critical thinking skills - Build empathy for trees - Practice writing skills	- LEEP field books - Markers and crayons

		- Students take 10 minutes to sketch and describe their tree in a reflection		
11:00 - 11:30	Journaling in Secret Spots	- Students choose a "secret spot" for their trail group to conduct a writing exercise - Students describe the spot engaging all senses - They also brainstorm ways in which the spot fits into the habitat at BFS	- Use critical thinking to draw connections between the larger ecosystem and secret spot - Develop writing skills - Students engage all ways of knowing in their reflections	- LEEP field books - Markers and pencils

Table 5: Lesson plan for week one in LEEP program.

Week six, primarily designed to stimulate the auditory senses, applies the PLT activity *Listen Up!* (refer to Table 6). In order to scaffold on the topics covered by the LEEP program in previous weeks, the activity is supplemented with other exercises that focus on biological relationships within ecosystems. Firstly, the students are prompted to experience the surroundings during the walk, by recognizing the varying sounds around them. The emphasis on auditory senses from the beginning is an integral element towards maintaining the theme of sound throughout the lesson plan. The next group activity is centered around the local ecosystem through exploring cultural legends of the native peoples, the Tongva. The story provides a simplistic view towards the creation of diverse ecosystems. Upon reflection on the story, students dissect the meaning of ecology. With this understanding, the students create an

illustrative storyboard which tells the Tongva legend. This exercise facilitates the next activity where the students brainstorm ways that fauna adapt to their surroundings. They work in a team and use critical thinking skills to navigate through all the sense systems to list adaptations of particular species. For example, barn owls have a satellite dish face to capture and channel sound to their ears, which helps them find prey. Following this theoretical activity, *Listen Up!* is incorporated into the lesson plan to get students moving and dominantly relying on their auditory senses. This fosters an emotional connection between the students and the environment based on their hearing and vision. The last reflection period of the lesson plan allows students to apply their understanding of the material by innovating a new species with biologically sound adaptations.

Time	Activity	Description	Learning Objectives	Materials
8:50 - 9:05	Tour to classroom	- Guide students to classroom and ask them to identify the different sounds they hear	- Prompt a naturalist approach to being outdoors by maintaining silence and observing - Engage with the surrounding environment	- Binoculars
9:05 - 9:40	Tongva Legend	- Split classroom in 4 groups according to the trail groups - Read pages in LEEP field book to introduce the native legend of how Earth was created - Create individual storyboards reflecting the legend	- Exposure to the native people of the land and their cultures - Hypothesize the crucial elements of ecosystems based on the legend	- LEEP field books - A4 size sheets - Markers and crayons
9:40 - 10:00	Snack Break			
10:00 – 10:30	Adaptations of Biota	- Split classroom in 4 groups according to the trail groups - Refresh the main sense systems - Brainstorm at least 3 adaptations for 8 species at the BFS - Mentors use large chart paper to record the discussion	- Identify key adaptations of certain species - Explore sense systems and the additional 10 ways of knowing - Develop critical thinking skills - Understand adaptations as an ecological process	- Large chart papers - Markers and pencils

10:30 - 11:00	Listen Up!	- Students choose an open area at the BFS in their trail groups - Students are asked to record the number of sounds they hear during a 3-minute period of silence - Mentors ask several questions about the sounds leading to a group discussion	- Students develop a sense of awareness using their auditory senses - Differentiate between anthropogenic and natural sounds - Investigate the sources of sounds developing problem solving skills	- LEEP field books - Markers and pencils
11:00 – 11:30	Journaling in Secret Spots	- Students write about an imaginary animal with adaptations to survive in an ecosystem	- Apply ecological knowledge of community interactions and adaptations - Practice creative writing	- LEEP field books - Markers and pencils

Table 6: Lesson plan for week six in LEEP program.

To put theory into practice, the two lesson plans serve as a comparison study that demonstrate the effectiveness of using music in environmental curricula. The lesson plans present several differences in their teaching approaches, structures, learning modalities, and materials covered (refer to Table 5 and 6). Learning modalities consist of the use of the primary senses in the student learning process such as vision (seeing), auditory (hearing), tactile (touching), and kinesthetic (moving). As a consequence, the lesson plans impact the students in various capacities forming a foundation for comparative study. The graded student reflections provide quantitative data as well, which serve as an assessment of the overall effectiveness of the lesson plan. As the students are graded on their effort and understanding of the material from the

day, I hypothesize that a comprehensive grasp of the information indicates an emotional investment towards the topic; student connection to the lesson plan directly translates into a more critical reflection. With the rationale that sound augments environmental sensitivity and in turn assists in fostering environmentally responsible behaviors, I predict that week six would show a higher average in the graded reflections on the scale from 1-4.

Results and Discussion

Week one demonstrates a class average of 2.84 on the grade scale showing a sufficient level of student connection to the lesson plan. Week six, however shows a significant increase in the grade scale with an average of 3.45 (t-test; $n = 31$, $df = 60$, p value = 0.001582). This data reveals a significant difference relative to the variation in the quantitative data. These significant difference can be attributed to several factors including the use of auditory senses in week six. In order to discuss the manifestation of results further, I analyze the lesson plans as the primary qualitative data for the research conducted.

The discrepancies between the two weeks can be attributed to the mentors who employ diverse teaching approaches where week one is mainly lecture based and week six relies on hands-on activities. The mentor teaching styles strengthen over the weeks with an emphasis on learning in smaller trail groups as well. Other factors that affect the results of the study include the subjectivity in grading reflections between all four mentors, learning modalities used which serve some students and not others, and the general topic of the week capturing a wide spectrum of interest. In terms of explaining the discrepancies through the student lens, by week six, students are more aware of the expectations to get a high grade on their reflection. This is both due to mentors developing a relationship with the students and the students taking ownership

over their engagement with LEEP. All these factors interact to dictate the effectiveness of the lesson plan in generating environmental sensitivity.

"During our 2nd three minutes of silence, I heard some of the same things, but I heard some different things. I heard the cattails rubbing together, tapping on the boat, people walking, cars, birds, wind, and an airplane" – Student A.

"I have noticed that in certain circumstances, you hear more man-made noises compared to animals. And vice-versa. I feel like this triggers animal senses and people senses in almost the same way" – Student B.

The quotes above are indicative of some themes that emerge from the activity *Listen Up!*. Pulled from two students' field books, these reflections demonstrate a comprehensive understanding of the activity and its purpose. Student A experiences the diversity of sound by challenging their auditory senses in interpreting their surroundings; they listen to differing sounds their second time conducting the activity where they explore the environment further, sparking intrigue. Student B engages with the activity in a different capacity, where they use their critical thinking skills to dissect the perception of auditory senses in other environments. They also demonstrate ownership over the activity by exploring the larger implications of sound in natural and urban environments. Both reflections received a four in their assessment, and display some of the outlined objectives of the NAAEE to have a positive impact on elementary students. The reflections exhibit the development of an additional tool to comprehend the environment and indicate a sense of responsibility (especially Student B). These outcomes

suggest the application of an effective curricula in comparison to week one, where both students receive a three in their graded reflections.

The forms of learning modalities utilized between week one and week six show significant variations, therefore, it is a crucial factor to consider. Week one fundamentally incorporates all learning modalities with the *Adopt a Tree* activity: students are encouraged to describe a tree outdoors based on sight and touch leading to a discussion incorporating hearing and movement. However, the emphasis on auditory learning in week one is limited in the lesson plan, as the modality is only addressed through the class lecture and collaborative discussion during the activity (refer to Table 5). On the contrary, week six highlights the auditory learning style with *Listen Up!*. The theme of sound continues to be the framework for the additional activities which consider senses in problem solving for the *Adaptations of Biota* brainstorm and the reflection period (refer to Table 6). This discrepancy in assessing the results of my research suggests the positive role of engaging the auditory senses. In turn, this research is representative of the potential of the integration of activities that stimulate auditory senses in environmental curricula.

The study conducted with LEEP is valuable towards achieving environmental education's goals of developing environmental sensitivity, understanding the interconnectedness of humans with the biophysical surroundings, and encouraging environmental advocacy. This analysis also serves as a template for further research on the use of auditory senses through musical mediums. While the study is an accurate characterization of the role of sounds, some components of the methodology can be improved. The source of quantitative data can be altered to include an assessment of student practical engagement with the lesson instead of only relying on the student's written reflections. A written exercise is not fully reflective of the knowledge and

inspiration gained by the student that week, leading to a potential misrepresentation of the effectiveness of the lessons in both weeks. Hence, I recommend measuring the effectiveness of the lesson plan by measuring student participation and curiosity. Further research should incorporate the dynamic role of sound in lesson plans as well; sound can be used as a natural connection, provide cultural and historic contexts about the environment, and can be a source of knowledge with musical lyrics. Regardless of the diverse ways of engaging the auditory senses, this research displays the important role music plays in attaining the ultimate goals of environmental education. This study provides a step towards exploring the theoretical lens of the field in directly affecting community involvement in the environmental movement.

Chapter 5

Significance

The environmental movement has been progressing for generations. It originally started as a response to the air pollution from the Industrial Revolution, but soon became a justice movement for the environment and the peoples affected by natural disasters such as the oil spill off the coast of Santa Barbara in 1969 and the mercury poisoning of the peoples of Minimata, Japan in 1971. April 22nd 1970 marked the first Earth Day that brought 20 million Americans together to hold peaceful demonstrations in favor of environmental reform (Lewis, 1985). Education, advocacy, participation, and action were the predominant themes of Earth Day, which are ensured through environmental education today. While the field of environmental education is young, history dictates its mission for promising environmental awareness leading to the recognition of Earth Day every day.

Early interest in the environment percolated in the early 19th century when poets like William Wordsworth travelled extensively and wrote about places such as the Lake District, England as "a sort of national property in which every man has a right and interest, who has an eye to perceive, and a heart to enjoy" (Wordsworth, 1835). Similar prose prompted the framework for preserving a "pristine" environment for individuals to enjoy away from home (Cronon, 1996). Countries began to adopt this conservationist approach in the late 19th century that started in South India, where the first permanent and large-scale forest conversation program was implemented (Cleghorn, 1861). Soon after, in 1916, President Woodrow Wilson founded the National Park Service with an aim to develop more efficient and professional management of natural resources. As a consequence, natural habitats were protected and native people were

displaced from their land. Shifting cultivation was also banned to emulate "the forests and gardens of South India" (Cleghorn, 1861). In the building of physical boundaries between natural resources and people, many communities lack an emotional connection to the environment. While the mission of raising advocacy maintains crucial to environmental education, the field builds interconnectedness between the environment and younger generations having a positive impact on child development (Wilson, 1994).

Moreover, music instills environmental sensitivity, which benefits the environmental movement. It offers influential qualities towards building the environmental movement outside of the classroom as well. In the words of Warren Waren (2012), "music is not to be considered a passive form of expression, but a dynamic, unifying, cultural, and political force". Such qualities manifest themselves as revolutionary fervor, as they did in the Jazz Revolution in the 1920s. Music propagates non-violent methods of awareness and physically enables individuals to feel connected to an environmental issue (Meyer, 2008). Its demonstrated impact with previous movements cannot be ignored; music can act to compound the power of environmental curricula. It is integral to consider the complete role of music in conjunction with environmental education as it holds significant potential.

The active and participatory aspects of music are fundamental in captivating advocates for the environment (Clayton *et a*l., 2004). Music draws children's minds by adding a fun element to academia, and provides a trend appeal due to the use of music in young generations (Turner & Freedman, 2004). The theoretical impacts of music are clear with environmental education (refer to Figure 1); however, it is essential to consider the role of the music industry. It offers an attractive niche for artists to inspire action in our youth and acts as an additional source of inspiration beyond the classroom. Social media influences children's perspectives of an issue,

allowing music to be a powerful tool to raise awareness with lyrics, while also generating responsible citizenship.

Several musicians use songs to invoke empathy for the environment. *"*We Are the World 25 for Haiti*",* a re-adaption of Michael Jackson's original song "We Are the World", inspired me to take action, but there are several other pivotal songs that affect individuals in different capacities. The Beatles, Neil Young, Sting, and Norah Jones are all principal musicians in using music as a medium to educate communities. The growing popularity of music festivals is an additional avenue to propagate environmental awareness in younger generations. The Global Music Festival for example, is a social action movement that strives to take action towards the world's biggest challenges, including the environment (Global Citizen, 2015). Earth Day, held on April 18, was the single largest event in Global Citizen's history bringing together 270,000 people on the National Mall in Washington, DC to fight climate change (Global Citizen, 2015). The event created a space for thousands to unite and facilitated a musical movement with artists dedicated to foster pro-environmental behaviors. While the event only reached a few thousand individuals that day, technology enables a larger impact influencing more communities as a consequence of the internet.

Further Thoughts

My argument is centered around the role of music in facilitating the goals of environmental education, however; my analysis does not include the reciprocal effect of environmental education on music. The use of music in conjunction with environmental education proves beneficial for children; it fortifies an interest in musicians and generates curiosity by learning music of other cultures. In addition, there is an enticing opportunity to

explore cultures using a musical framework, which can spark interest in other fields such as ethnomusicology. Learning through music allows students to develop an interdisciplinary lens and enhances their critical thinking skills with respect to academia. Incorporating music with environmental education not only exposes students to the musical field, but also encourages cross-disciplinary learning from a young age. With exposure to environmental advocacy using music, the music industry can eventually utilize a larger niche for artists who participate in the environmental movement.

In terms of further research in curricular development, my research predominantly considers music's role in outdoor settings with children. However, in examining the power of music with environmental education, additional roles for music in environmental pedagogy in the classroom should be explored. Despite the fact that there is literature on the impact of natural soundscapes in the classroom (Schafer, 1986; 1993), additional activities conducted indoors should be recorded for instructors who lack access to outdoor spaces. Although natural soundscapes are one way to introduce music in the classroom, there are other means of doing so. For instance, in a classroom setting, educators could use online videos to present information regarding environmental issues in a medium that is easily understood by students.

My intention is to continue this research during my master's degree in Environmental Conservation Education at New York University from 2017-18. I am eager to explore the dynamic use of music in a heightened cultural context, building an interdisciplinary lens in children. This concentration in the conjunction of music and environmental education offers additional ways to study sustainable practices and discuss the social aspects of the environmental movement. My positionality within exploring diverse cultures and their music will inform my

research and dictate my approach towards exploring the intersection to heighten environmental advocacy.

Conclusion

"The more clearly we can focus our attention on the wonders and realities of the universe about us, the less taste we shall have for destruction" (Carson, 1963).

It is integral to be mindful of the interconnectedness that binds humans with the environment. Recognition of the diversity in music, culture, and biotic species, amongst other aspects, is fundamental toward creating a more sustainable narrative in future generations. Environmental education embodies principles of community and progress, and assists in fostering environmental sensitivity: so why not utilize the dynamic role of music with curricula in facilitating the goals of the environmental movement? Music offers multiple compounding affects in building a connection between children and the environment. In recognition of music to be an antecedent to the generation of environmental sensitivity in the literature, environmental education can develop its interdisciplinary lens and gain a larger academic audience. As a result, the intersection of music with environmental education can be promoted and utilized to its demonstrated potential with children. Music, as a universal form of expression, is not only instrumental in promoting environmental citizenship, but can be a way to achieve an environmental revolution.

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